RELATIONSHIP BETWEEN

HUMAN CAPITAL AND FIRM PERFORMANCE:

A STUDY OF TELECOM EQUIPMENT COMPANIES

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ABSTRAK

Kajian ini adalah penelitian tentang hubung kait diantara dua aspek metrik modal insan, iaitu hubungan di antara pendidikan dan pengalaman dengan prestasi syarikat dari dua syarikat di dalam bidang perkilangan peralatan telekomunikasi di Kuala Lumpur. Subjek kajian ini adalah terdiri daripada 98 kakitangan jualan dan pemasaran dari dua syarikat peralatan telekomunikasi. Respon daripada 98 kakitangan (Eksekutif / Pengurus Jualan , Eksekutif / Pengurus Akaun dan Pengurus Besar Jualan dan Pemasaran) dari dua syarikat antarabangsa terkenal ini telah digunakan semasa mengkaji kaitan di antara faktor demografi yang dipilih (tahap pendidikan dan tahun pengalaman) dengan prestasi syarikat. Keputusan kajian menunjukkan bahawa pendidikan dan pengalaman dalam kedua-dua syarikat mempunyai kesan positif terhadap prestasi syarikat, namun prestasi syarikat bergantung lebih tinggi terhadap tahap pendidikan daripada pengalaman. Secara logiknya boleh disimpulkan bahawa modal manusia yang diperlukan untuk meningkatkan prestasi syarikat akan lebih cenderung untuk dicungkil daripada kakitanga yang mempunyai tahap pendidikan yang tinggi berbanding pengalaman kerja dalam industri yang sama.

ABSTRACT

This study examined the relationship between two human capital metrics, that is education and experience with firm performance of two companies in the sector of telecom equipment manufacturing in Kuala Lumpur. The subjects were 98 sales and marketing employees in both the telecom equipment companies. Responses from this 98 employees (Sales Executive / Manager, Account Executive / Manager and General Manager of Sales and Marketing) of two internationally renowned companies were used in this correlational study between selected demographic factors (level of education and years of experience) and the firm performance. The results of regression analysis showed that both education and experience in both companies were found to positively impact firm performance, with firm performance more highly correlated to level of education than experience. It seems logical that the human capital needed to enhance firm performance would be more likely to arise from level of education than years of experience in the same industry.

Chapter 1

INTRODUCTION

1.0 Introduction

An educated and experienced workforce is critical for telecom equipment firms' ability to innovate and compete in the market. Surprisingly, there is very little research on how level of education and industry experience contributes to the profitability of telecom equipment firms' performances. Using theories from human capital literature, we propose a model to measure how level of education and industry experience impact on firm performance in telecom equipment industry. The paper seeks to test empirically a variety of hypotheses related to human capital metrics and firm performance within the telecom equipment industry. In our model, human capital had two dimensions: (1) level of education and (2) industry experience. We hypothesized that higher levels of education and more years of industry experience from previous employment led to better firm performance. A survey through two telecom equipment firms validated our hypotheses.

1.1 Background

In today global market, companies are composed and surrounded by competitors, regardless of industry. To develop and sustain competitive advantage, it is important that firms really leverage on their workforce as a competitive weapon. Strategy like improving workforce productivity to drive higher value for the firms has become an important focus. Firms trying their best to optimize their workforce through all kind of human capital development programs. Ideally, it is to achieve their business goals and it is also important for long term survival and sustainability. To accomplish this undertaking, firms will need to invest resources to ensure that employees have the knowledge, skills, and competencies they need to work effectively in a rapidly changing and complex environment especially in a critical human capital resources

based industry like telecom equipment industry where not only technology play a vital role.

What is “telecommunications”? Telecommunications as a word has its origins in Greek. It's a combination of tele which means 'Far Off' and Communications which is an 'exchange of information'. In its simplest terms “the transmission of messages over significant distances”.

In earlier times, telecommunications involved the use of visual signals, such as smoke and signal flags or audio messages via coded drumbeats or lung-blown horns. In the modern age of electronics, telecommunications has typically involved the use of electric means such as telegraph and telephone, the use of fiber optics and their associated electronics. The first breakthrough into modern electrical telecommunications came with the development of the telegraph during the 1830s and 1840s and it exploded into use around the world during the 19th century and later connecting the continents via submarine cables on the floors of the ocean. Early inventors and developers in the field of electrical and electronic telecommunications included Samuel F.B. Morse, Alexander Graham Bell, Nikola Tesla and etc. A revolution in wireless telecommunications began in the first decade of the 20th Century, with Guglielmo Marconi winning the Nobel Prize in Physics in 1909 for his pioneering developments in wireless radio communications.

Then comes the Internet, a very complex and revolutionary invention of the late 60s by the National Science Foundation has changed our world. The Internet as we now know it, has been an information explosion, From e-mail to eBay, communication, shopping, education, commerce etc. have forever changed. Figure 1.0 illustrates how Internet backbone spans across the world.

As of 2008, an estimated 21.9% of the world population has access to the Internet with the highest access rates (measured as a percentage of the population) in North America (73.6%), Oceania/Australia (59.5%) and Europe (48.1%). In terms of broadband access, Iceland (26.7%), South Korea (25.4%) and the Netherlands (25.3%) led the world.

Figure 1.0 World wide Internet Backbone

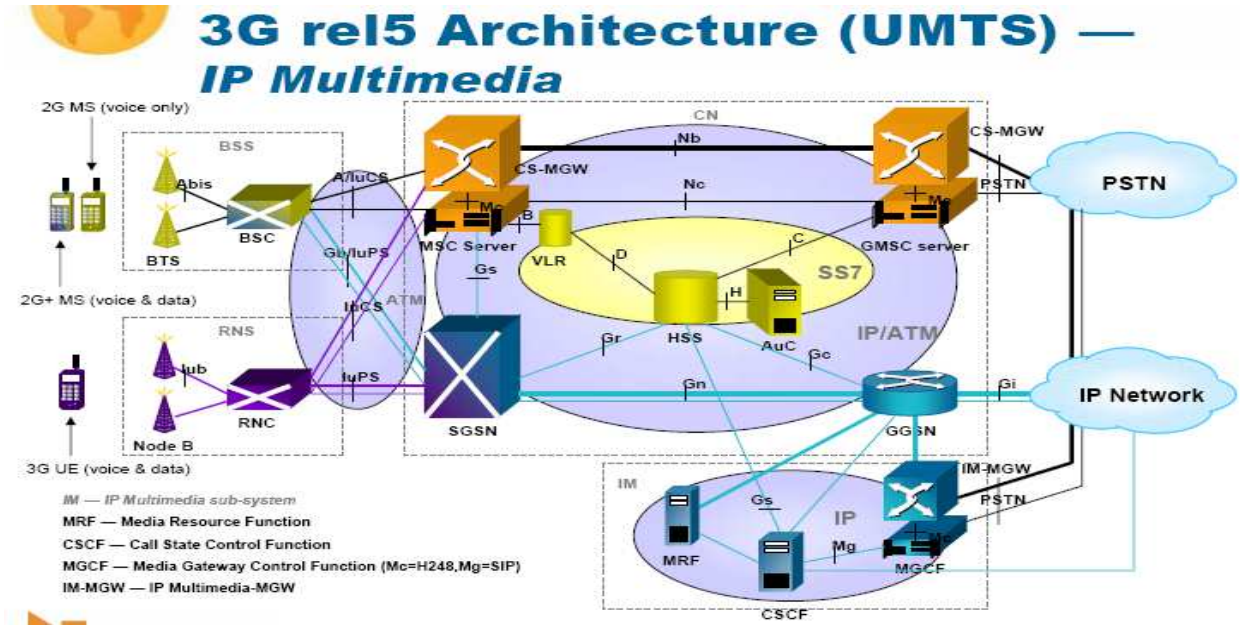

Figure 1.1 3G, GSM and Mobile Broadband Architecture

Into the 21st century, the world demand for communications has evolved further. Subscribers demand high speed (Broadband) access to multimedia (data, voice, and video) information, to and from the Internet or any parties, anytime-and-anywhere by using computers and any kind of mobile broadband terminals. To address such demands, international standard bodies like ETSI, IEEE, ITU and etc has been putting a lot of efforts to standardize modern telecommunication networks' specifications. Figure 1.1 illustrates one of the standards to address 3G, GSM and mobile broadband communications needs in the modern world.

Telecommunications play a significant role on society in various aspects like economy, social relationships, cultural and politics. Worldwide telecommunication industry's revenue was estimated to be $3.85 trillion in 2008. The service revenue of the global telecommunications industry was estimated to be $1.7 trillion in 2008, and by 2013 it is expected to touch $2.7 trillion.

For many years, products made by telecom equipment manufacturer were completely proprietary, from the board to the application. This was highly expensive for these companies; however, they were able to absorb the engineering costs by virtue of the fact that their products, despite their relatively low "parts" costs, were extremely expensive. However, telecom equipment manufacturer do not sell a single product to a carrier, but a grouping of products for an end-to-end solution, and were thus able to gain additional revenue from services not simply consisting of service contracts (wherein they would agree to fix or replace a product or part within a certain amount of time), but also from installation and deployment. Today, only a handful of manufacturer survived due to competition. In this study we have surveyed two of them that are highly successful in the industry.

In response to the changes, most firms have embraced the notion of human capital has a good competitive advantage that will enhance higher performance. Human capital development becomes a part of an overall effort to achieve cost-effective and firm

performance. Hence, firms need to understand human capital that would enhance employee satisfaction and improve performance. Although there is a broad assumption that human capital has positive effects on firms' performance, the notion of performance for human capital remains largely untested. Hence, this paper attempts to look into the connection between human capital and firm's performance in the telecom equipment industry.

In the era of knowledge economics, with the fall of industrialization (Crawford, 1991; Nordhaug, 1993). Intangible assets has taken place of tangible assets, such as land and machines, and become the most important and major materials in the process of gaining profit (Chen, et al., 2003; Roos et al., 1998). Based on the view of resource-based theory, intangible assets in a firm are usually rare, unique, and inimitable, it leads to competitive advantage (Barney, 1991; Black et al., 1994). Among all intangible assets, there is consensus that human capital is the most critical competitive resource of a firm.

The world is experiencing a revolution in information technology, innovation, and telecommunications, which is driving the emergence of the knowledge-based economy. This requires successful organizations of the twenty-first century to recognize the importance of human capital as a source of sustainable competitive advantage.

This research uses a resource-based perspective to examine the role of human capital in determining firm performance. Resources are defined as "all assets, capabilities, organizational processes, firm attributes, information, knowledge, etc. controlled by a firm that enables it to improve its efficiency and effectiveness" (Barney, 1991). Barney categorized firm resources as: (1) physical capital resources, such as physical technology used, equipment, and geographic location; (2) human capital resources, such as experience and training; and (3) organizational capital resources, such as internal and external relationships and firm planning. Because these resources are valuable, rare and not easily imitated, they lead to competitive advantage and better firm performance (Barney 1991).

Education has long been used as a measure of future career success with the assumption being that there is a direct relationship between academic achievement and vocational success (Judge et al., 1995; Melamed, 1996). Individuals with advanced educational backgrounds develop more intellectual capability and knowledge that can aid them in making strategic choices which can lead to firm performance in any business environment (Becker, 1993; Hitt et al., 2001).

Focusing on start-up firms in Korea, Jo & Lee (1996) found founder's level of education related to firm profitability. Similarly, Mengistae (2006) found founder's years of schooling related to small firm survival and growth. Sapienza and Grimm (1997) found founders' general educational level positively related to firm performance.

1.2 Problem Statement

The rapid development of technology has increasingly driven the demand for skilled employees (Doms et al., 1997; Falk & Seim, 2001). Therefore, complementary relationship between information technology and human capital may be an important factor to explain the shift toward skilled labor (Falk & Seim, 2001). The importance of skills set is more significant in IT industries and even more significant in the telecom equipment industry due to hardware and network architecture complexity. As Ang et al., (2002) suggest, "IT jobs are complex, requiring knowledge of difficult technical concepts such as data modeling, process engineering, and design theory".

However, as it relates to the telecom equipment industry in particular, individuals who have a longer tenure with a firm or in a particular industry tend to have an historical perspective that cannot be easily replicated. The value of industry experience in business is always appreciated, especially in recruitment and selection. Medoff and Abraham (1980, 1981) found that experience (an important component of human capital) was associated with higher

earnings but not with higher performance in the two firms they studied. Medoff and Abraham (1980) found that performance does not appear to be a mediating factor in the within-grade-level positive relationship between either education or labor force experience and earnings. In other words, within groups of similar jobs, despite the positive correlation between "human capital" and earnings, there does not appear to be a positive correlation between "human capital" (education and experience) and performance. Therefore, this study examines level of education and experience on firm performance on two similar firms within the same industry through comparison.

Although human capital is measured in different ways (education, experience, and training) in prior research, education and experience are often the most commonly used metrics for human capital (Carmeli & Tishler, 2004). In particular, education is becoming more important when there is a rapid technological change because schooling enhances employee skills that facilitate the gathering, processing, and interpreting of information (Bartel & Lichtenberg, 1987). The seminal work on human capital theory by Becker (1964) suggests that level of education is a strong indicator of human capital.

Even though there is paucity of studies that have directly assessed the effects of education on company performance, a number of studies showed education could contribute to firm performance (Doms et al., 1997). Ballot et al., (2001) use training as a metric of human capital to explore the complementarities between human capital and R&D, but their results were inconclusive. They further speculate that education or experience and not training is likely to be the dominant variable which interacts with R&D, and recommend further studies in this area which use education or experience as the core metrics for human capital. Therefore the problem here is to examine whether there is a relationship between education and firm performance.

1.3 Research Objectives

The objectives of this study are as follows:

Objective 1: Examining the relationship between human capital metric of industry experience and firm performance.

Objective 2: Examining the relationship between human capital metric of education and firm performance.

Since data sample was collected from two companies in the similar industry and nature of products, comparison on the results of both companies would be discussed in the look out of consistencies.

1.4 Research Questions

To achieve the objectives of this study, the following questions were put forward in this study:

Question 1: What would be the relationship between human capital metric of industry experience and firm performance?

Question 2: What would be the relationship between human capital metric of education and firm performance?

1.5 Significance of the Study

Globalization and acute competition has driven all industry towards the strive to

maintain sustainable positioning in the market. In early studies, Barney (1991) has identified human capital resources as one of the critical factor for competitive advantage. Since human capital resources are valuable, rare and not easily imitated, they lead to competitive advantage and better firm performance (Barney 1991).

Based on study by Ballot et al. (2001), further studies on use of education or experience as the core metrics for human capital was recommended. Many other factors of resource-based view can be imitated like physical capital resources, physical technology used, equipment, and geographic location. Since firm performance serve as bottom line of measurement of success of a firm, this study hope to shed lights on two metrics of human capital that is level education and industry experience as both metrics could still be controlled by firms. Telecommunication had turned into a necessity for every human being, therefore this study hope to enable telecom equipment manufacturing industry to stay in its sustainable position.

1.6 Organization of Remaining Chapters

The remaining chapters of this report will cover a review of the literature pertaining to human capital, education, experience, and firm performance including the instruments used to measure it. Chapter 3 describes the methodology used in this study while chapter 4 reports on the analysis of the data obtained and this chapter conclude with the testing of the hypotheses. The final closing chapter discusses the results of the findings of this study and the conclusion derived.

Chapter 2

LITERATURE REVIEW

2.0 Introduction

A literature review on articles pertaining to human capital with focus on education and experience and firm performance was carried out. There were very few published articles on telecom equipment manufacturer with regards to this area. Telecommunication sector has become so competitive that almost all manufacturers in the industry have fall under merger and acquisition process.

2.1 Definition of Key Terms

What is human capital? Human capital regarded as one of the metric of intellectual capital, an aggregate of intangible assets in a firm (Brooking, 1996; Edvinsson, et al., 1997a, 1997b; Roos et al., 1998). Meanwhile, it is widely agreed that human capital is the key metric of intellectual capital. In this section, existing literature on this topic will be reviewed. Recent strategic management research contributing to the theory of the firm by proposing the resource based view which states that the firm is a bundle of unique capabilities (Barney, 1991; Mahoney and Pandian, 1992). One of the key resource which is valuable, scarce and inimitable that help a firm retain its competitive advantage is human capital (Lado and Wilson, 1994). Human capital theory suggests that people possess skills, knowledge, and abilities that provide economic value to firms (Tsang, 1987). The characteristics of firm specific human capital, such as scarcity, non-substitutability, which require a firm to incur heavy replacement costs make human capital more valuable to firms (Barney, 1991).

2.1.1 Definition of Human Capital

Based on definition of Schultz (1993), “human capital” is a key element in improving

firm assets and employees in order to increase productivity as well as sustain competitive advantage. In order to sustain competitiveness in the organization, human capital becomes an instrument used to increase productivity. Human capital refer to processes that relate to training, education and other professional initiatives in order to increase the levels of knowledge, skills, abilities, values, and social assets of an employee which will lead to the employee's satisfaction and performance, and eventually on a firm performance. Rastogi (2000) stated that human capital is an important input for organizations especially for employees' continuous improvement mainly on knowledge, skills, and abilities. Thus, the definition of human capital is referred to as "the knowledge, skills, competencies, and attributes embodied in individuals that facilitate the creation of personal, social and economic well-being" (Organization for Economic Co-Operation and Development or OECD, 2001: 18).

Human capital was widely studied on the basis of human capital theory, which has gone through a prosperous development after the works of theorists such as Becker, (1964); Schultz, (1962); Mincer, (1958; 1974). Because skills, knowledge, and experiences, possessed by individuals, are believed to contribute economical value to firms, people are viewed as human capital. Human capital is an intangible asset, it can't be realized unless being utilized through process of organization, cooperation, and interaction within individuals and work system (Jackson, et al., 1995). Various definitions of human capital have been stated (Becker, 1993; Chen, 2003; Crawford, 1991; Edvinsson, et al., 1997a, 1997b; Roos, et al., 1998). The simplest definition might be "skilled, educated people", stated by Crawford, (1991). Becker, (1993), stated that human capital comprises skills, experience, knowledge, personality, appearance, reputation, and credentials. Edvinsson, et al., (1997b) noted that human capital includes, "all individual capabilities, the knowledge, skill, and experience of the company's employees and managers", the ability and willing to learn and demonstrate new skills, and "creativity and innovativeness of the organization".

Human capital in particular represents the individual stock of knowledge embedded in the firm's collective capability to extract the best solutions from its individual employees (Bontis, 1999, 2001). It is defined as the sum of the workers' skills, experience, capabilities, and tacit knowledge (Edvinsson and Malone, 1997b). Davenport and Prusak (1998) add that "human capital includes the intangible resources of abilities, effort, and time that workers bring to invest in their work".

Human capital is considered one of the core components of intellectual capital and is a critical resource in many industries such as software development, management consulting and financial services. For example, McKinsey & Company recognize that the most important corporate resource over the next 20 years will be human capital, defined as talented, smart and sophisticated business people who are technologically literate, globally astute, and operationally agile (Dess and Shaw, 2001).

The relationship between human capital and various outcome variables can be traced back to many streams of research, including economic human capital theory (e.g. Schultz, 1961; Ducharme, 1998), organizational learning (Bontis et al., 2002), the resource-based view of the firm (Barney, 1991) and more recently the knowledge-based view of the firm.

Figure 2.0 presents a list of definitions of human capital proposed by a number of human resource theorists and this study would be based on experience and education metrics.

Scholar (year)	**Definition of Human Capital**
Becker (1964; 1993)	He proposed human capital comprise skills, experience, knowledge, personality, appearance, reputation, and credentials.
Crawford (1991)	Human capital was defined "skilled, educated people".
Norhaug (1993)	Norhaug argued that human capital can be distinguished into two dimensions, one is the employee's basic capacity to perform the tasks and the other is the willing to do on the job. He stated that the former constitutes health and competences and the latter includes work motivation and commitment.
Edvinsson and Malone (1997a; 1997b)	It was noted that human capital includes, "all individual capabilities, the knowledge, skill, and experience of the company's employees and managers", the ability and willing to learn and demonstrate new

	skills, and “creativity and innovativeness of the organization”
Roos et al. (1998)	They proposed human capital is derived from competence, attitude and intellectual agility. Competence, by their definition, symbolizes “what the organization can do, its innermost potential, thanks to its employees”, whose major elements are knowledge and skills. Attitude, regarded as a “soft component”, is “the value generated by the behavior of the employees on the workplace”, which is affected by motivation, behavior and conduct. And intellectual agility is defined as “the ability to use the knowledge and skills, building on it, applying it in practical contexts and increasing it through learning”, which may include innovation, imitation, adaptation, and packaging (Roos et al., 1998)
Davenport (1999)	Davenport regarded human capital as a mix of ability, behavior, effort, and time. Ability is the extent of how well an individual master a job, and it comprises knowledge, skill, and talent. He also asserted a human capital equation, claiming that total human capital investment equals to the aggregate of ability and behavior multiply effort and time.
Chen and Lin (2003)	Human capital was defined as investments made by company in talents and technologies that benefit competitive advantages, are valuable and unique, and should be kept out of reach of other companies. They noted that a company’s investments in human capital are investments in the personnel who contribute to a company’s strategic goals, demonstrate uniqueness and high value and are barred by the company from being employed by other competitors.

Figure 2.0 List of Definition of Human Capital

2.1.2 Human Capital and Human Resource Management

Basic concept of human capital has been stated. Although Human Resource Management is not directly part of this study it is crucial if we could understand the ambiguity to the understanding of the relationship of human capital and human resource management. Based on perspective of resource-based view of the firm, human resources refer to the potential of workforce to contribute to sustainable competitive advantage (Barney, 1991). To utilize human capital, firms have to make use of policies, practices, and systems that could influence employees’ behavior, attitudes, and performance, (Noe, et al., 2000), which is human resource management. Figure 2.1 represents the relationship of human resource management, human

capital, and firm performance in the perspective of resource-based view of the firm performance.

In different industries and organizations, employee's skills, knowledge, and their abilities may vary in terms of value. In order to maximize the value of human capital, firms are required to link strategy, management practices, cultures, and individuals' performance. Therefore, human resource management, especially strategic human resource management are practice in order for organization's strategy to be deployed, organized and utilized its human resources to achieve goals (Wright, et al., 1992). To put human capital concept into practice, it is necessary to know how to assess the contribution of human capital to a firm. This is why human resource management being studied to understand it linkage to human capital. Next, theoretical and human capital metrics will be reviewed.

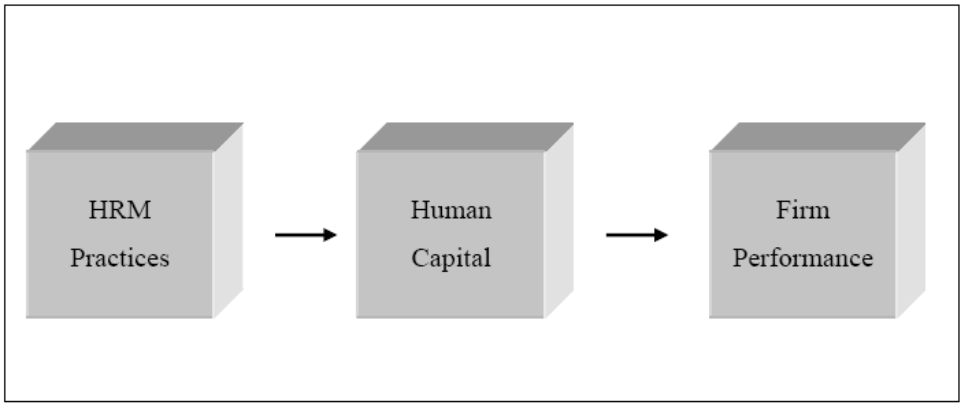

Figure 2.1 Resource Based View of Firm Performance

2.2 Firm Performance

Performance can be viewed in few aspects depend on the application. (Torrington, 1995) stated performance as bottom line profit, doing better than competitors, maximum organization effectiveness and achieving specific organization objectives. In fact, Laitinen, (2002) defined performance as the ability of an object to produce results in a dimension

determined a priori, in relations to a target. Recent study conducted by Cho and Punick, (2005) have confirmed that top managers increasingly relate quality to firm performance and hence it has been viewed as one of the important key variables in achieving long-term competitive advantage. Yun and Good, (2007) stated that loyalty is positively related to support company's profitability and the long-term growth. Indeed, some researcher posted there is something about the way that decisions were made in successful organizations that shows the seeds of eventual failure (Christiansen, 1997).

Researchers have measured performance in various ways. For instance, Kirchhoff, (1977) used profitability, Sexton and Robinson, (1989); Smith et al., (1987) used income, while Orser et al., (2000) employed revenue and number of employees (i.e. size of business). Measuring performance by employing revenue and number of employees is pertinent to small and new businesses that lack credit history. Furthermore, revenues are a valid measure for presenting the overall performance for a homogenous industry such as telecom equipment industry with similar costs (Wesson and Nieva de Figueiredo, 2001). In this research 5-point Likert scale is used to measure firm performance, (1-strongly disagree), (2-disagree), (3-neither agree nor disagree), (4-agree) and (5-strongly agree).

Return on Assets is a key profitability ratio, which measures the amount of profit made per dollar of assets that they own. It measures the companies ability to generate profits before leverage with it's own assets, rather than by using leverage in the form of shareholders' equity or other debt liabilities. Generally speaking, the higher this number is the more effective the company is in utilizing its assets. Return on assets is a key profitability measure, which can be used to measure relative efficiency of companies within the same industry who have a similar product or service line. Return on Assets is not useful when comparing sectors against each other or companies within different sectors. Even though a company may be in the same sector, it does not mean that it will have a similar product or service offering, thus we have to be

careful too. Typically, this number is most useful when using it as a historical benchmark that a company uses to measure its relative performance against past periods. Sector to sector comparisons are misleading due to the fact that some sectors are far more capital intensive, requiring large capital expenditures up front to run their business. Oil and Telecommunications are good examples of industries that are extremely capital intensive. Their return on asset ratio may yield a lower result than that of a consulting company who has very low asset requirements. Return on Assets is useful for analyzing competing companies in the same industry. In this case, we have two companies of the same country of origin (from China) and very similar by products and services offered as well as size of organization too. Besides for comparing competitive firms, Return on Assets is useful for gauging the profitability of a company on an absolute basis. High Return on Assets firms is more profitable than low Return on Assets firms.

2.3 Human Capital and Firm Performance

Organizational and human resource management researchers argue that the human capital is critical to firm outcomes (Barney & Zajac, 1994; Lepak & Snell, 1999; Pfeffer, 1994; Sherer, 1995). Companies must invest on human capital to generate expected benefits or returns. There are studies that shown that investing and leveraging human capital with human resource practices will have positive relation to organization performance and increase the productivity. In this section, the direct relationship between the selected metrics of human capital will be reviewed.

2.3.1 Experience

Examining only one type of firm (technology-based companies and educational software companies respectively), Roure and Keeley, (1990) did not find a significant

relationship between industry experience and firm performance. Cooper, Woo, and Dunkelberg, (1989) found a significant positive relationship in a cross-industry analysis; however, this study did not examine the relationship between experience and performance directly. Instead, what was shown was that individuals started larger firms if they had prior experience with similar products or services.

People with experience of working in a particular industry or department bring their knowledge of how the industry operates to the business and this becomes particularly important where industry-wide competition cannot be avoided. While experience in the same industry has recently been considered a necessary condition for the initiation of new ventures, attempts by researchers to define industry experience have been less clear. Cooper and Bruno, (1977) found that team members' prior experience in marketing and technology within a similar industry was particularly important. Stuart and Abetti, (1986) extended the definition to include prior experience of running their own companies, or earlier general management experience, within the same industry as the new venture. Vesper, (1976) stated that not only experience, but also a variety of experiences in different functional areas was an indicator of better performances by new ventures. Timmons, (1994) argued that entrepreneurs typically develop a solid base and a wide breadth of management skills and know-how over a number of years of working in different functions (e.g. sales, marketing, manufacturing, and finance). However, he further emphasized that it is critical to have a management team whose skills are complementary rather than being dependent on a single individual with an absolute set of skills. Roure and Keeley, (1990) also found that team completeness in terms of industry experience and knowledge was a major predictor of success.

2.3.2 Education

Education is intuitively believed to be a gauge of individual knowledge in society. Even

though there is scarcity of studies that have directly assessed the effects of education on company performance, a number of studies showed education could contribute to firm performance (Doms et al. 2009). Coffey and Herrmann, (1976) noted formal education could have effects on entrepreneurial success, because it provides individuals with broad perspectives and general skills applicable for demand of the work. Education has also been found to increase substantially a worker's ability to be innovative on the job.

There are also numerous studies, suggesting that higher education levels have positive influence on willingness and ability to utilize new technology. Couples of existing studies found that higher average education levels in a workplace are associated with higher productivity. Black and Lynch, (1996), employing data from the Educational Quality of the Workforce National Employers' Survey and Cobb-Douglas production function, found average educational level has a positive and significant influence on the productivity in both the manufacturing and non-manufacturing sectors. Even though little supportive literature on relationship of education and firm performance has been explored, screen theory argued that conducting degree of education to be a screen metrics of the level of human capital is a rational decision-making for employers.

2.4 Underlying Theory

The underlying theory used for this study is Resources Based View Theory whereby human capital has been chosen as our focus because it is unique and inimitable as compared to other resources within the above mentioned theory.

2.5 Gaps in the Literature

There is a lack of research on telecom equipment manufacturer's firm performance with regards to impact of level of education and experience. This is probably due to lack of

degree level courses for telecommunication in the past until recently where ICT (Information Communication Technology) was introduced.

There is also lack of instruments to measure sales and marketing respondents of telecom equipment companies. Resource Based View focuses on the analysis of internal strengths and weaknesses, paying particular attention to the ways in which firms can develop valuable resources and erect barriers to imitation. It is however, without conceptual weaknesses. Strategy analysts should remember that the firm exists in environments: resources are not ends in themselves but are useful when they create value markets.

2.6 Theoretical Framework

The purpose of this research is to develop a model to show the relationship between human capital (level of education and industry experience) and firm performance. As argued in the earlier discussions, the general human capital investment includes training, education, knowledge and skills that will enhance human capital effectiveness. Based on the literature reviews, it is therefore postulated that human capital leads to greater firm performance. This research intended to be conducted at an individual level as what human capital theory was concerned. Human capital metrics serves the independent variable, including industry experience and education. The dependent variable is firm performance, measured by Return on Assets at a specific year. The Theoretical Framework of the research is illustrated as below.

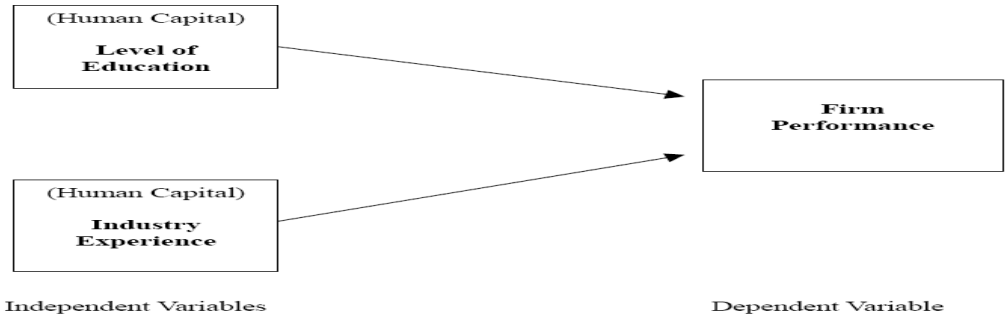

Figure 2.2 Conceptual Model linking Human Capital Metrics and Firm Performances

2.7 Hypotheses

Based on the Theoretical Framework as above, the hypothesis generated are as following.

Through literature review there are some establishment of positive relationship between CEO functional experience with firm performance, founder experience with small firm performance, entrepreneur experience with small and medium firm performance, therefore we hypothesize:

Hypothesis 1: There is a positive relationship between industry experience and firm performance.

Since there are numerous studies, suggesting that higher education levels have positive influence on willingness and ability to utilize new technology. Couples of existing studies found that higher average education levels in a workplace are associated with higher productivity. Black and Lynch, (1996), employing data from the Educational Quality of the Workforce National Employers' Survey and Cobb-Douglas production function, found average educational level has a positive and significant influence on the productivity in both the manufacturing and non-manufacturing sectors. Even though little supportive literature on relationship of education and firm performance has been explored, therefore we hypothesize:

Hypothesis 2: There is a positive relationship between level of education and firm performance.

Chapter 3

METHODOLOGY

3.0 Introduction

This chapter describes the methodology used is this study. It covers the research design, instruments, variables, data collection, data analysis and the procedure employed.

3.1 Research Design

This research will conduct analysis with self-completion questionnaire survey on two telecom equipment firms to study the regression analysis to assess the ability of the model.

3.1.1 Instruments

The instruments to be used in this research would be self-completion questionnaires survey for two selected telecom equipment firms that are all located in Kuala Lumpur. First, a pilot study was conducted. The survey instrument was first tested on eight professionals in the telecom equipment sector. This further generated a substantial list of the goals and performance measures of the telecom equipment companies. Next, the list was presented to the head of Sales and Marketing of five telecom equipment companies to ensure its clarity, and ability to get responses. The data of the study are collected via email from the head of sales and marketing of both companies in the sampling frame accompanied by a letter from USM-GBS.

3.2 Variables

3.2.1 Independent Variable

There are two independent variables to represent human capital in this study. The operational definition of each is:

Industry experience

This independent variable in this survey is the demographic variables in Section A and B, data collected like previous job experience and years in the previous job. This section requires the respondent to provide personal data such as age, gender, position in company, employment, current position, year in position, area and years of previous job. In Section C, there are four questionnaires that relate experience with firm performance.

Level of education

This independent variable in this survey is the demographic variables in Section A and B, data collected include highest degree earned and area of study. In Section C, there are four questionnaires that relate education with firm performance.

Section	Variable	No. of items
C	Experience	4
C	Education	4

3.2.2 Dependent Variable

Firm performance

Due to the limitations of collecting sensitive financial data from the telecom equipment companies. Dess and Robinson (1984) used an item, simply asking respondents to rate "overall firm performance"; whereas Delaney and Huselid (1996) combined responses to four items rating performance with respect to marketing, growth in sales, profitability, and market share. In addition, Dess and Robinson's (1984) single-item measure required respondents to compare their company to "firms of similar sales volume in your industry and region"; and Delaney and Huselid's (1996) 4-item measure asked "compared with other organizations that do the same kind of work, where comparison were made on organization's performance over the last 3

years"

Section	Variable	No. of items
D	Firm Performance	5

For Section C and D, respondents were required to respond on a 5-point Likert-type scale with (1) strongly disagree, (2) disagree, (3) neither agree nor disagree, (4) agree and (5) strongly disagree.

Another subjective measurement of firm performance would be Return on Assets that would be used to compare both the companies. Computation of Return on Assets would be as follows: -

Return on Assets = Net Income / Total Assets

3.3 Population and Sample

This research will conduct analysis through data collected through questionnaire survey like some other prior works, for better comprehensive understanding the status qua of human capital metrics in the telecom equipment industry. Data collection in this study is challenging. There are about five major telecom equipment companies in the world and all five do have a sizable set up in Malaysia. Two companies have been selected which are rather close by sizing, composition of product, country of origin, competitive pricing level and after sales support and maintenance. In order to ensure that the data collected could represent the population of study, respondents are only from Sales and Marketing department of both the companies. Since we are comparing the Return on Assets of both company and Sales are directly linked to Net Income which is the numerator of Return of Assets, therefore Sales and Marketing department are the most influential department that has a direct impact on the sales revenue. A brief of both the companies are included as below. A total of one hundred twenty questionnaires were given to both the companies and 52 from Company A responded while 46 from Company B

responded. In order to ensure a high response rate, questionnaire are customized to its best simplicity whilst without loosing it objectives and preliminary phone calls were made to the head of Sales and Marketing of both companies. Since the questionnaire included variables on firm performance, the respondents were assured of full confidentiality. The sample represents 84% of the population of Sales and Marketing in Company A and 92% of Company B. Following is a brief on both Company A and Company B**:**

Company A - is the largest networking and telecommunications equipment supplier in the People's Republic of China. It is headquartered in Longgang District, Shenzhen, Guangdong. Established in 1988 by Ren Zhengfei, Company A is a private high-tech enterprise which specializes in research and development (R&D), production and marketing of communications equipment, and providing customized network services for telecom carriers. Company A serves 35 of the top 50 telecoms operators and puts 10 per cent of revenue into R&D each year. In addition to the R&D centers in various cities in China, Company A also has R&D centers in Sweden, U.S, India, Russia, Indonesia; and Netherlands. Within a short period of time, Company A has seen a rise to become the world No. 2 company in the mobile equipment industry just slightly behind Ericsson.

Company A provides fixed network, mobile network, data communications, optical network, software & services and terminals, including modems - ranging from switching, integrated access network, NGN, optical transport, IN, GSM, GPRS, EDGE, W-CDMA, CDMA2000. Company A is also a manufacturer for mobile phones such as the Vodafone 710 and 716, 3G HSDPA cards such as E620, 3G HSDPA USB modem, E220, 3G HSUPA modem stick, and E172. By the end of 2008, global contract sales of Company A, China's largest telecom gear maker, jumped 46 percent to 23.3 billion USD.

Company B - is a publicly-owned, Chinese corporation that designs and manufactures telecommunications equipment and systems. Based in Shenzhen and established in 1985,